

What is claimed is:

1. A composition for detackifying paint in an aqueous system comprising an aqueous mixture comprising a flocculant and/or a coagulant and a polyarylamine polymer formed by the reaction of less than 2 moles of an aldehyde per mole of arylamine in the presence of an acid in an aqueous solution.

2. The composition according to claim 1, wherein the aldehyde is a compound having the formula



where R^1 is hydrogen or an alkyl, aryl, alkylaryl, arylalkyl, arylamino, alkylamino, carboxyl, or aldehyde group.

3. The composition according to claim 1, wherein the aldehyde is selected from the group consisting of formaldehyde, acetaldehyde, propionaldehyde, benzaldehyde, crotonaldehyde, butyraldehyde, glyceraldehyde, glyoxalic acid, glyoxal, glutaraldehyde, and mixtures thereof.

4. The composition according to claim 1, wherein the aldehyde is formaldehyde.

5. The composition according to claim 1, wherein the aldehyde is provided by an aldehyde releasing agent selected from the group consisting of trioxane, polyoxymethylenes, paraformaldehyde, and hexamethylenetetramine.

6. The composition according to claim 1, wherein the arylamine comprises an amine bonded directly to a cyclic compound.

7. The composition according to claim 1, wherein the arylamine comprises a member selected from the group consisting of aniline, alkylanilines, phenylenediamines, aminophenols, methylenedianiline and its homologues, and mixtures thereof.

8. The composition according to claim 1, wherein the arylamine is selected from the group consisting of aniline, toluidine, aminophenol, aminosalicic acid, anthranilic acid, sulfanilic acid, and mixtures thereof.

9. The composition according to claim 1, wherein the arylamine comprises aniline.

10. The composition according to claim 1, wherein the polyarylamine polymer comprises an amine modifier selected from the group consisting of primary amines, secondary amines, amides, imides, imidines, polyamines, alkylenepolyamines, aminoalcohols and mixtures thereof.

11. The composition according to claim 10, wherein the amine modifier is selected from the group consisting of methylamine, dimethylamine, benzylamine, ethylenediamine, phenylenediamines, aminophenols, diethylenetriamine, monoethanolamine, diethanolamine, fatty amines, dicyandiamide, melamine, urea and combinations thereof.

12. The composition according to claim 10, wherein the amine modifier is selected from the group consisting of melamine, dicyandiamide, urea, diethylenetriamine, monoethanolamine and mixtures thereof.

13. The composition according to claim 10, wherein the amine modifier is melamine.

14. The composition according to claim 1, wherein the molar ratio of aldehyde:arylamine in the reaction to form the polyarylamine polymer is from about 0.5:1 to less than 2:1.

15. The composition according to claim 1, wherein the molar ratio of aldehyde:arylamine is from 1.3:1 to 1.9:1.

16. The composition according to claim 1, wherein the ratio of molar equivalents of acid:moles arylamine in the reaction to form the polyarylamine polymer is from 0.2:1 to 3:1.

16. The composition according to claim 10, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 10:1.

17. The composition according to claim 10, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 5:1.

18. The composition according to claim 10, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 3:1

19. The composition according to claim 1, wherein the flocculant is selected from the group consisting of organic flocculants (cationic, anionic, nonionic, zwitterionic), polyvinylalcohol, styrene/acrylate copolymers, acrylate/acrylamide copolymers, cationic acrylamide
5 copolymers, dicyandiamide/formaldehyde polymers, melamine/formaldehyde polymers, urea/formaldehyde polymers, and mixtures thereof.

20. A composition for detackifying paint comprising an aqueous suspension of paint at a pH of greater than about 5, and an amount of a
10 polyarylamine polymer that is sufficient to detackify the paint in the aqueous suspension and wherein the polyarylamine polymer is one that is formed by the reaction of less than 2 moles of an aldehyde per mole of arylamine in the presence of an acid in an aqueous solution.

21. The composition according to claim 20, wherein the
15 aldehyde is a compound having the formula



where R^1 is hydrogen or an alkyl, aryl, alkylaryl, arylalkyl, arylamino, alkylamino, carboxyl, or aldehyde group.

22. The composition according to claim 20, wherein the
20 aldehyde is selected from the group consisting of formaldehyde, acetaldehyde, propionaldehyde, benzaldehyde, crotonaldehyde, butyraldehyde, glyceraldehyde, glyoxalic acid, glyoxal, glutaraldehyde, and mixtures thereof.

23. The composition according to claim 20, wherein the
25 aldehyde is formaldehyde.

24. The composition according to claim 20, wherein the arylamine comprises a member selected from the group consisting of aniline, alkyanilines, phenylenediamines, aminophenols, methylenedianiline and its homologues, and mixtures thereof.

30 25. The composition according to claim 20, wherein the arylamine is selected from the group consisting of aniline, toluidine, aminophenol, aminosalicic acid, anthranilic acid, sulfanilic acid.

26. The composition according to claim 20, wherein the arylamine comprises aniline.

27. The composition according to claim 20, wherein the polyarylamine polymer comprises an amine modifier selected from the group consisting of primary amines, secondary amines, amides, imides, imidines, polyamines, alkylenepolyamines, aminoalcohols and mixtures thereof.

28. The composition according to claim 27, wherein the amine modifier is selected from the group consisting of methylamine, dimethylamine, benzylamine, ethylenediamine, phenylenediamines, aminophenols, diethylenetriamine, monoethanolamine, diethanolamine, fatty amines, dicyandiamide, melamine, urea and combinations thereof.

29. The composition according to claim 27, wherein the amine modifier is selected from the group consisting of melamine, dicyandiamide, urea, diethylenetriamine, monoethanolamine and mixtures thereof.

30. The composition according to claim 27, wherein the amine modifier is melamine.

31. The composition according to claim 20, wherein the molar ratio of aldehyde:arylamine in the reaction to form the polyarylamine polymer is from about 0.5:1 to less than 2:1.

32. The composition according to claim 20, wherein the molar ratio of aldehyde:arylamine is from 1.3:1 to 1.9:1.

33. The composition according to claim 20, wherein the ratio of molar equivalents of acid:moles arylamine in the reaction to form the polyarylamine polymer is from 0.2:1 to 3:1.

34. The composition according to claim 27, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 5:1.

35. The composition according to claim 27, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 3:1

36. A method of producing a polyarylamine polymer comprising reacting less than 2 moles of aldehyde per mole of an arylamine in the presence of an acid to form a polyarylamine polymer.

37. The method according to claim 36, wherein the reaction of aldehyde and arylamine is carried out in an aqueous solution.

38. The method according to claim 37, wherein the aqueous solution after the reaction is complete is a clear liquid.

5 39. The method according to claim 38, wherein the clear liquid containing the polyarylamine can be added directly to aqueous liquids in need of paint detackification or color reduction without further processing.

40. The method according to claim 36, wherein the aldehyde is a compound having the formula



where R¹ is hydrogen or an alkyl, aryl, alkylaryl, arylalkyl, arylamino, alkylamino, carboxyl, or aldehyde group.

41. The method according to claim 36, wherein the aldehyde is selected from the group consisting of formaldehyde, acetaldehyde, propionaldehyde, benzaldehyde, crotonaldehyde, butyraldehyde, glycerinaldehyde, glyoxalic acid, glyoxal, glutaraldehyde, and mixtures thereof.

42. The method according to claim 36, wherein the aldehyde is formaldehyde.

20 43. The method according to claim 36, wherein the aldehyde is provided by an aldehyde releasing agent selected from the group consisting of trioxane, polyoxymethylenes, paraformaldehyde, and hexamethylenetetramine.

44. The method according to claim 36, wherein the arylamine
25 comprises an amine bonded directly to a cyclic compound.

45. The method according to claim 36, wherein the arylamine comprises a member selected from the group consisting of aniline, alkyranilines, phenylenediamines, aminophenols, methylenedianiline and its homologues, and mixtures thereof.

30 46. The method according to claim 36, wherein the arylamine is selected from the group consisting of aniline, toluidine, aminophenol, aminosalicyclic acid, anthranilic acid, sulfanilic acid.

47. The method according to claim 36, wherein the arylamine comprises aniline.

48. The method according to claim 36, wherein the polyarylamine polymer comprises an amine modifier selected from the group consisting of primary amines, secondary amines, amides, imides, imidines, polyamines, alkylene polyamines, aminoalcohols and mixtures thereof.

49. The method according to claim 48, wherein the amine modifier is selected from the group consisting of methylamine, dimethylamine, benzylamine, ethylenediamine, phenylenediamines, aminophenols, diethylenetriamine, monoethanolamine, diethanolamine, fatty amines, dicyandiamide, melamine, urea and combinations thereof.

50. The method according to claim 48, wherein the amine modifier is selected from the group consisting of melamine, dicyandiamide, urea, diethylenetriamine, monoethanolamine and mixtures thereof.

51. The method according to claim 48, wherein the amine modifier is melamine.

52. The method according to claim 36, wherein the molar ratio of aldehyde:arylamine in the reaction to form the polyarylamine polymer is from about 0.5:1 to less than 2:1.

53. The method according to claim 36, wherein the molar ratio of aldehyde:arylamine is from 1.3:1 to 1.9:1.

54. The method according to claim 36, wherein the ratio of molar equivalents of acid:moles arylamine in the reaction to form the polyarylamine polymer is from 0.2:1 to 3:1.

55. The method according to claim 48, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 10:1.

56. The method according to claim 48, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 5:1.

57. The method according to claim 48, wherein the molar ratio of amine modifier:arylamine is from 0:1 to 3:1